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Indian Standard
SPECIFICATION FOR
NITROCELLULOSE SURFACER

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR NITROCELLULOSE SURFACER

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Indian Standard

SPECIFICATION FOR NITROCELLULOSE SURFACER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 19 June 1971, after the draft finalized by the Paints and Allied Products Sectional Committee had been approved by the Chemical Division Council.

0.2 The nitrocellulose surfacer is used as surfacer or filler in a painting system intended for automobile bodies to achieve high grade of finishing. For good performance, it is desirable that the primer, surfacer and finishing paints are obtained from the same manufacturer. For purposes of testing, the primer, surfacer and finishing paint should be from the same source.

0.3 This standard achieves the alignment of JSS 3012 'Specification for paint, PFU, surfacer, nitrocellulose, spraying, grey light ISC No. 631' issued by the Department of Standardization, Ministry of Defence, Government of India as the requirements prescribed in JSS 3012 are covered by this standard.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for nitrocellulose surfacer intended for use as a surfacer or filler coat in a painting system for finishing of instruments, equipment, automobiles, aircrafts and for general purposes.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 101-1964† and IS : 1303-1963‡ shall apply.

*Rules for rounding off numerical values (*revised*).

†Methods of test for ready mixed paints and enamels (*second revision*).

‡Glossary of terms relating to paints (*revised*).

3. REQUIREMENTS

3.1 Composition — The material shall be manufactured from good quality nitrocellulose (see IS: 1091-1968*), resins, plasticizers, pigments and thinner in suitable proportions as to satisfy the requirements of this standard.

3.2 Durability

3.2.1 Normal Outdoor Exposure — When prepared and tested as prescribed in **A-2**, a general breakdown of the film prepared from the registered sample of the material shall not occur in less than 12 months.

3.2.2 Accelerated Weathering — A film of the registered sample shall be prepared and tested as prescribed in **A-3**, in an accelerated weathering apparatus for a period of 100 hours not exceeding 7 hours a day and a complete record of its performance maintained.

NOTE — As a precaution against inadvertent accidents, it is recommended that the outdoor exposure test (**A-2**) and the accelerated weathering test (**A-3**) are carried out in duplicate.

3.3 Weight in kg/10 litres — The minimum weight in kg per 10 litres of the material shall be within ± 3 percent of the approved sample when tested as prescribed in **25** of IS: 101-1964†.

3.4 The material shall also comply with the requirements prescribed in Table 1.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed as agreed to between the purchaser and supplier.

4.2 Marking — The containers shall be marked with the name of the material; manufacturer's name and registered trade-mark, if any; volume of the material and month and year of manufacture.

4.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

*Specification for cellulose nitrate (first revision).

†Methods of test for ready mixed paints and enamels (second revision).

TABLE 1 REQUIREMENTS FOR NITROCELLULOSE SURFACER

(Clause 3.4)

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			APPENDIX	CL No. IN IS : 101-1964*
(1)	(2)	(3)	(4)	(5)
i)	Drying time, hard dry and compatibility	Not more than 30 minutes with no tendency to lift the underlying coats	—	7.1, 7.2 and 7.3
ii)	Consistency	Smooth and uniform	—	7.4
iii)	Finish	Smooth and matt or egg-shell-gloss	—	7.5
iv)	Colour	Near match to Indian Standard colour No. 631 light grey or any other colour as agreed to	—	11
v)	Scratch hardness	No such scratches as to show the bare metal	—	15
vi)	Flexibility and adhesion	No visible damage or detachment of film	—	16
vii)	Volatile matter	± 5 percent of the approved sample	—	26
viii)	Suitability for rubbing down and recoating	To pass the test	B	—

*Methods of test for ready mixed paints and enamels (second revision).

4.3 Where the material is intended for Defence purposes, the packing and marking shall be in accordance with IS : 5661-1970*.

5. SAMPLING

5.1 Representative samples of the material shall be drawn as prescribed under 3 of IS : 101-1964†.

*Code of practice for packing and marking of packages of paints, varnishes, enamels and allied products.

†Methods of test for ready mixed paints and enamels (second revision).

6. TEST METHODS

6.1 Tests shall be conducted as prescribed in IS : 101-1964* and Appendices A and B. References to appendices are given in 3.2 and col 4 of Table 1, and to relevant clauses of IS : 101-1964* in 3.3 and col 5 of Table 1.

6.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960†) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

APPENDIX A

(Clause 3.2)

TEST FOR DURABILITY

A-0. GENERAL

A-0.1 Outline of Method — The durability of the material is determined by ascertaining actual behaviour of suitably prepared test panels in normal outdoor exposure test for a specified period and evaluating the results of this exposure by a suitable method of rating for various characteristics of the painted film. Apart from this, the material is also evaluated by an accelerated weathering test wherein a prepared panel is subjected to controlled exposure of heat, light and water in an artificial weathering apparatus.

A-1. PREPARATION OF TEST PANELS

A-1.1 Prepare the mild steel panel of size $300 \times 300 \times 1.6$ mm and free from surface imperfections as follows:

- a) Degrease the panels with suitable solvent and then dip for 5 minutes in a bath containing the following:

	<i>Parts by Weight</i>
Orthophosphoric acid (sp gr 1.7) (<i>see</i> IS : 798-1968‡)	54
Butyl alcohol (<i>see</i> IS : 361-1962§)	10
Denatured spirit (<i>see</i> IS : 324-1959)	10
Water	26

*Methods of test for ready mixed paints and enamels (*second revision*).

†Specification for water, distilled quality (*revised*).

‡Specification for orthophosphoric acid (*first revision*).

§Specification for *n*-butyl alcohol, technical (*revised*).

||Specification for ordinary denatured spirit (*revised*).

Remove the panels and wash with boiling water to remove all traces of bath solution and dry at 60°C for 15 minutes. Cool the panels to room temperature.

- b) Apply a coat of primer (conforming to IS : 2074-1962*) on to the panels by spraying to give a dry film weight of 30 to 45 g/m² and allow to dry.
- c) Apply one coat of the material thinned suitably to spraying consistency to give a dry film weight of 30 to 45 g/m² and dry for 30 minutes. Apply two further coats with an interval of 20 minutes in between coats and air dry for 4 hours.
- d) Rub down wet with emery paper No. 280, followed by No. 400 until the surface is sufficiently smooth and even to take a coat of the finishing paint. About 0.05 mm thickness of the film shall be left after flattening. Wash the surface with water to remove all loosely adhered dust and dry for 30 minutes.
- e) Wipe with petrol damped rag. Apply one coat of the finishing by spraying to give a dry film weight of 15 to 30 g/m² and dry for 10 minutes. Apply two further coats of the finishing with an interval of 10 minutes in between coats and dry for 24 hours.
- f) Light rub down wet with emery paper No. 400 to give a smooth surface. Wash thoroughly with water and dry for 30 minutes.
- g) Then rub the film with a suitable cutting paste, wash with petroleum hydrocarbon solvent (*see* IS : 1745-1966†) to remove dust and abrasive and finally give a polish using a soft cloth with polishing cream conforming to IS : 5480-1969‡.

A-2. NORMAL OUTDOOR EXPOSURE TEST

A-2.0 Subject the sample for registration to normal outdoor exposure test in the manner described under A-2.1.

A-2.1 Expose for 12 months in the open the test panels, prepared in the mannner prescribed under A-1, in duplicate, in a position facing south at 45°. Commence the exposure not earlier than last week of January and not later than the first week of March.

A-2.1.1 Examine the condition of the exposed films at monthly intervals for gloss retention and at bimonthly intervals for the other characteristics given below:

- a) Colour;
- b) Checking, cracking and blistering;

*Specification for RMP, red oxide-zinc chrome, priming.

†Specification for petroleum hydrocarbon solvents (*first revision*).

‡Specification for automobile polish, paste.

- c) Chalking; and
- d) Blooming and spotting.

A-2.1.2 For the above examinations, wash the right hand half of the surface of the two test panels by pouring water and then wiping with a soft cloth or chamois leather (*see* IS:1070-1966*). Adequate time for cooling of the panels to room temperature shall be allowed prior to washing. Polish half of the left half of the panel and assess gloss and colour after polishing. Examine the same portions of the test panels at each examination. As an aid in the examination, a magnifying glass may be used, but the evaluation shall be based on an assessment with the unaided eye. At the end of the stipulated period for durability test, examine all the three portions of the test panels. The sample shall be considered satisfactory if the material surface underneath as well as condition of the film in all the parts, the one washed periodically, the one polished periodically and the one washed only for the final examination is satisfactory by the method of evaluation described hereunder (*see* **A-2.2**). Stray film failure due to extraneous causes other than climatic shall be ignored.

A-2.2 Method of Rating — The film of an unexposed test panel possessing high gloss shall be rated at 100, which figure shall be made up of basic values as follows:

a) Possessing high gloss after polishing	20
b) Possessing correct colour	20
c) Freedom from checking, cracking and blistering	35
d) Freedom from chalking	10
e) Freedom from blooming and spotting	15
	<hr/>
	100
	<hr/>

NOTE — The initial rating of film may be 100 or less according to the condition of gloss and colour, the rating for freedom from checking, cracking and blistering, chalking, blooming and spotting being always maximum in the case of unexposed films.

A-2.3 Evaluation of Exposed Films — In recording the condition of the exposed films at each examination express the observed relative value of different characteristics in percentages of the basic value allotted to each characteristic under **A-2.2**. For arriving at an assessment, multiply the basic value for each assessment (**A-2.2**) by the percentage awarded for the performance in the test and divide the product so obtained by 100 to

*Specification for water, distilled quality (*revised*).

obtain the percentage award for the observed value of each characteristic. Take the sum of these resulting values as the overall assessment.

A-2.3.1 The following table is intended to serve as an example for the assessment of paint film after exposure:

<i>Sl No.</i>	<i>Characteristic</i>	<i>Basic Value, Percent</i>	<i>Performance Value, Percent</i>	<i>Assessment Value, Percent</i>
(1)	(2)	(3)	(4)	(5)
i)	Possessing high gloss after polishing	20	100	20
ii)	Possessing correct colour	20	60	12
iii)	Freedom from checking, cracking and blistering	35	20	7
iv)	Freedom from chalking	10	80	8
v)	Freedom from blooming and spotting	15	50	7.5
				54.5

A-2.4 Results of Exposure—Reckon the period for the general breakdown of the exposed film from the date of commencement of exposure to the time when the overall assessment falls below 50 percent or when the performance value of any one characteristic falls below 25 percent of the basic value adopted for that characteristic. In the example given under **A-2.3.1**, although the overall assessment is 54.5 percent, yet the film is to be regarded as generally having broken down, because the performance value of checking, cracking and blistering has fallen below 25 percent of its basic value.

A-3. ACCELERATED WEATHERING TEST

A-3.1 Accelerated Weathering Apparatus—An artificial weathering apparatus of the carbon arc type shall be used for uniform and controlled exposure to the effects to heat, light and water.

A-3.2 Samples for registration shall be tested in duplicate in a suitable accelerated weathering apparatus (**A-3.1**) and samples drawn from bulk supplies shall be tested in a similar manner. The test panels shall be prepared as described under **A-1.1**. The requirements of this test shall be taken to have been satisfied if the performance of the film is not materially different as compared with the record of the film of the registered sample.

APPENDIX B

[*Table 1, Item (viii)*]

TEST FOR SUITABILITY FOR RUBBING DOWN AND RECOATING

B-0. GENERAL

B-0.1 Outline of the Method — The painted panel is rubbed down with No. 280 wet abrasive paper followed by No. 400 wet abrasive paper. A coat of the finishing paint is applied and the ability of the undercoat to take the finishing coat is judged.

B-1. PROCEDURE

B-1.1 Prepare a mild steel panel, $150 \times 150 \times 1.25$ mm, as prescribed in **A-1.1** (up to Stage C). Allow the panel to dry for 4 hours. Rub the panel with No. 280 wet abrasive paper followed by No. 400 wet abrasive paper to give a smooth even surface and then wash thoroughly with water to remove loose dust. Dry for 30 minutes. Apply the finishing paint as described in **A-1.1(d)**. The material shall be deemed to have passed the test if it is possible to apply the finishing paint to give a satisfactory surface and the surface shall not show any deep scratches and clog abrasive paper during sanding operation.

INDIAN STANDARDS INSTITUTION

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

Telegrams : Manaksanstha (Common to all Offices)

Regional Offices:

Telephone

*Western	: Manakalaya, E9 MIDC, Marol Andheri (East) BOMBAY 400093	6 32 92 95
†Eastern	: 1/14 C. I. T. Scheme VII M V. I. P. Road, Manikotla CALCUTTA 700054	36 24 99
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